



# The Minuteman



Volume 11 Number 4

The OFFICIAL NEWSLETTER of the  
MINUTEMAN REPEATER ASSOCIATION

March 1983

## MEETING NOTICE

### MARCH MEETING - LADIES NIGHT

- PLACE:** Weston Campion Center
- DATE:** Monday, March 28, 1983 (Note change of date)
- TIME:** 7:30 PM, Doors open at 7:00 PM for socializing
- PROGRAM:** After a short business meeting to appropriate \$500 for a new microprocessor controller, Jack Harrigan, W1PSG, will present a program on Covered Bridges in New Hampshire. This program has been enjoyed by everyone who has seen it. I'm sure it will be a hit.
- RAFFLE:** Cash prize! Split the pot - you get half - MMRA gets half. Raffle tickets still \$1 each.
- REFRESHMENTS:** A Wine and Cheese Party is being scheduled. Bring the XYL and enjoy the festivities. The admission price will be \$2.50 per person to cover the cost of the goodies. Make your reservations early through your local repeater representative - meeting hall space is limited to 150 persons.
- Reservations will be taken:
- |                     |                  |       |
|---------------------|------------------|-------|
| on Marlboro 01-61   | by Roger Tessier | K1TCV |
| on Quincy 07-67     | by Joe Devin     | W1MW  |
| on Stoneham 115-715 | by Leo Morgan    | K1LRX |
| on Weston 22-82     | by Bob Ling      | W1IBF |

To that end we have purchased a separate repeater from Hamtronics, which is a complete repeater but without fancy bells and whistles that increase costs. We will be able to use this at other repeaters in an emergency and this will give us double redundancy; for example the second 01/61 repeater could be employed at 07/67 in an emergency.

The Board of Directors voted to place the second MMRA controller on the 450 MHz machine as opposed to Weston (22/82) because Weston can be updated without a new controller, at least for the present time. This will give the 450 machine autopatch and make it one of the most, if not the most powerful machine (in terms of coverage) with autopatch and microprocessor control in New England.

The 220 MHz machine was purchased as a complete repeater, but in a kit. The repeater is almost completed and the proud father of the construction is Tom Holmes, WA1ZID, Tech. Chief at 07/67 who will be the Trustee of the machine. The crystals were donated by the Two Twenty Club of Framingham and the output of the repeater will be 224.40 (down 1.6 MHz transmit standard ARRL band plan). Budgetary requirements will restrict the machine to bare bones operation in the beginning, but it's co-location with 07/67 will enable it to cover great distances.

One reason for all this activity is to give the most to members that we can for the money; another is that we feel that there will be expansion, some of which will be generated by the inevitable no-code license. Regardless of your personal feelings for this license class, good operators who will upgrade can be obtained, and if we are responsible for their training, the buck stops here.

Although some members will be obtained from the new candidates, the immediate ability to continue to provide these top notch services to members at the 1970 dues structure depends upon the number of members we have. We will be having a membership drive to help assure our goals but we do need your support. If each of you can bring one new member to the next meeting or get one to sign up we can be sure of planning the budget for next year to give each of you the services that you all deserve.

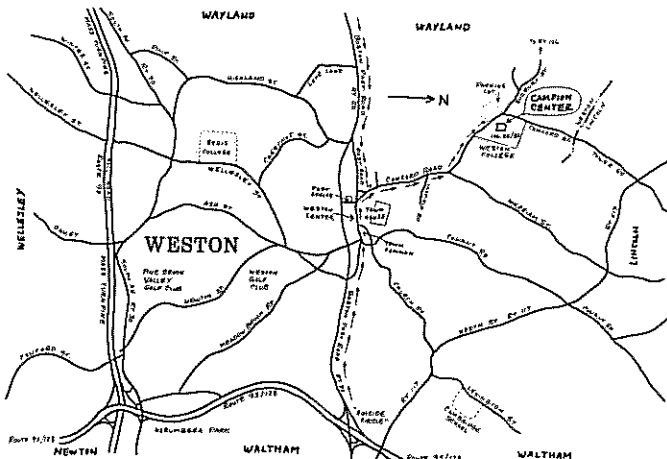
The March meeting is planned as a fun affair for members to enjoy and relax.

I promise you that the business meeting will be short and the guest speaker will have a reasonable time limitation so that we can enjoy the social aspects of the evening. There will be details of the meeting elsewhere in this newsletter and your attendance will be greatly appreciated.

In closing, I depart on a sad note because of the passing away of Jack Ferguson, W1HIM on Tuesday, February 22. Jack was not only the Tech. Supervisor of the Weston repeater, but was one of the founding fathers of the MMRA. Despite the fact that Jack suffered from progressive illness, he found the time and energy to devote to the MMRA and Ham Radio in general.

His suggestions to the organization, and technical help was most beneficial to the organization over the years, and in times of severe weather and adverse road conditions or other emergencies, Jack would tirelessly assist in road reports, phone patches and use of his own telephone to assist the cause. Even recently, when an illness of the magnitude suffered by Jack would have prevented the average person from considering the future of Ham Radio, Jack fought the battle of the Mount Greylock repeater organization by actively seeking Ham support, contacts with interested persons, and speaking to politicians. He very recently championed the cause of Ham Radio by opposing Anti-Tower Legislation, and by making documentation available to Hams trying to educate local cable TV committees. Our profound sympathy to Ruth, WISCS, his ever-supporting Wife, and the Ferguson family. We will miss you Jack.

73, DE AL KA1AL, President



## PRESIDENT'S CORNER

This fiscal year we have emphasized technological and equipment progress with a view toward keeping our repeaters not only reliable but up to date and expandable to meet future technology and expansion of the HAM population.

Most of us know that we operate four two meter repeaters, a 450 MHz repeater and a soon-to-be-employed 220 MHz repeater.

It has become apparent that not all are aware that our two meter repeaters have redundancy, that is, that each repeater has a separate back-up repeater that can be employed in case of major failure.

## EDITOR'S CORNER

Once a year I build up a head of steam to the bursting point. The time has come to release all my pent up thoughts—so here goes!

What ever happen to 2-meters?? It's rapidly becoming the "vast wasteland" that former FCC head Newton Minnow once tagged on the TV spectrum. My career in ham radio spans a brief five year period. During that time I sense that a change has taken place. Granted the fact the 220 MHz and 440 MHz band have become more popular but that still does not explain where everyone has gone!

As of the last headcount, the MMRA has over 475 members. On a given day a scan of our 4 2-meter repeaters will attest to the fact that only a few "regulars" can be heard on the air. Without waxing nostalgic, I can remember when nightly, informal groups would join in QSO's on our repeaters. Now the ID chip holds court to a not-so-talkative listening audience.

I must confess that I have been as guilty as the next guy or gal in this lack of interest. Home computers and other social interests have taken a good part of our leisure time.

I think that it is time to reverse the trend. For starters let's check in to the Public Service Net on Tuesday evening. Don't just sit there watching those red and green LED readout displays doing their thing. Warm up those finals! I'm sure that the technical supervisors of the four 2-meter repeaters would like to have the chance to change the final amplifier tubes more often due to over-use than due to old age.

There now — I said it and I feel better.

73's Bill, KB1DY

## SILENT KEY

We regret to announce the death of Jack Ferguson, W1IIM, of Wayland on February 22, 1983. Jack was a member of the MMRA for many years and was a friend to all who knew him. His wit and knowledge of electronics and life in general enlightened all of us each time we talked to him or listened to the stories that he told. He will be missed by all. Our condolences to Ruthe and his family. Memorial donations may be made to the Parmenter Health Center in Wayland or to the Jesuit Retirement Fund at the Campion Center.

Editor

## TREASURER'S REPORT

Period: Feb. 1, 1983 to Feb. 28, 1983

EXPENSES		INCOME	
01-61	\$ -0-	Advertising	\$ 20.00
07-67	45.23	Membership dues	380.00
115-715	22.35		
22-82	6.25	Total Income	\$400.00
President	30.00		
Secretary	21.03		
Meetings	139.57		
WICT project	100.00		
Total Expenses	\$343.43		

## CONSOLIDATED REPORT

Period: May 20, 1982 to Feb. 28, 1983

EXPENSES		INCOME	
01-61	\$1,544.44	Advertising	\$ 100.00
07-67	2,069.46	Coffee & D'nuts	127.47
115-715	249.30	Membership dues	6,910.00
22-82	942.61	Raffle	679.75
220 MHz Rptr.	601.75	Miscellaneous	11.00
Newsletter	1,290.84		
President	65.39	Total Income	\$7,828.22
Secretary	267.60	Bal. forward	
Treasurer	16.00	5/20/82	\$4,808.39
WICT project	500.00	Total Income	7,828.22
Meetings	471.80		
Raffle	565.90	Total Expenses	-8,585.09
Total Expenses	\$8,585.09	Balance 2/28/83	\$4,051.52

Bill, KB1DY

## K1GGP KORNER

I have just been informed that Jack Ferguson — W1IIM is now a silent key. The shocking news of the passing of this fine and rare gentleman who was a great friend of many of us will take a long time to sink in.

Not only will his resonant voice and timely comments be missed, his helpfulness to struggling hams, his devotion to his family — to MMRA, his humor, his patience under trying circumstances, his gentlemanly deportment at all times, his knowledge of the sciences, his capacity of true love of his fellow man no matter what their origin will not be forgotten.

Some people pass on and leave great monuments with nicely carved words on them. In Jack's case this does not seem necessary — for as some one once said — "To live in the hearts of men, is not to die" — Amen.

Murray Finer, K1GGP  
Hallandale, Fla.

## PUBLIC SERVICE

## PUBLIC SERVICE COMMUNICATION SEMINARS

The next public service seminar, on April 14 will be on the tricks of running a message-handling net. The featured speaker is Marcia Osborn, KA1GBS, who's known for efficient operations on the Heavy Hitters Traffic Net.

In the works for future sessions are a talk on what hams can learn from aviation radio procedures, and a control tower tour, and Don Black, KA1BTV, on "Interfacing with CAP and Air Force MARS."

The seminars are on the second Thursday each month, at 7:30 PM, at Waltham Civil Defense headquarters, 27 Lexington St. The Minuteman Repeater Association's public service committee co-sponsors the seminar series. Both organizations welcome inquiries from Amateur Radio Operators and those interested in getting their licenses. Radio talk-ins to the seminars are via the MMRA's Weston repeater, on 146.82 MHz.

## NOMINATING COMMITTEE REPORT

The Nominating Committee has recommended to the President, Alan Kunian, KA1AL, the following candidates for Officers for 1983-84:

President	Alan Kunian KA1AL
Vice President	Gene Piken WB1HAP
Secretary	Evelyn Benson KA1BBN
Treasurer	William Shaughnessy KB1DY
Clerk	Charles Hanson WA1YRQ
Director	Frank Comfort N1BXW
Director	Thomas Holmes WA1ZID

Earle Benson W1HXP Chairman  
Joseph Fermano W1RRN  
Marty Kullen K1GRB

## RAFFLE PRIZE WINNER

Winner of the Raffle Prize, an IC4AT walkie, at the January meeting was Bob Hastings, K1BJQ, "Mister 61". Lefty was well on his way home when he heard the announcement that he had won the drawing. Needless to say, he turned around promptly to claim his prize. He remarked early in the meeting that his "biorhythm was good for the day". When questioned about whether he would be spending more time on 450 than 61, he replied "you won't get rid of me that easily". Congratulations, Lefty, on your good fortune.

## BLUE RIBBON CORNER

Earle, W1HXP, and Evelyn, KA1BBN, are collecting blue ribbons right and left for organizing and hosting the 715 get-together at Augustine's in Saugus on January 31. Thirty two people gathered for a purely social, low-key, informal buffet supper at this well-known eatery and all enjoyed the fun of having eyeball QSO's with those who frequent the Stoneham machine.

## at the DIRECTORS' MEETING

DIRECTOR'S MEETING - January 5, 1983

Meeting called to order at 7:45 PM. Present were Al Kunian KA1AL, Gene Piken WB1HAP, Bill Shaughnessy KB1DY, Evelyn Benson KA1BBN, Earle Benson W1HXF, Bill Wade K1IJZ, Gerry Horne K1GOL, George Downs W1CT, Dave Thornburg N1HR, and newsletter production coordinator Charlie Hanson WA1YRQ. Steve Tolf K1ST, Bob Ling W1IBF, and Mort Grant W1JSH were welcome observers.

Steve Tolf reported on the 2 meter and 450 MHz repeaters at Marlboro. Mort Grant reported on Stoneham, both sites were experiencing no major problems. Al Kunian has a report from Quincy that the repeater had been insulated to prevent damage to the logic circuits. Bill Wade reported no problems at Weston.

Al requested all trustees to inventory and mark all repeater equipment belonging to the MMRA.

A 220 MHz repeater for the MMRA was discussed and approved. A Hamtronics kit was authorized to be purchased.

Mort Grant offered a fox hunt proposal for club members. Mort will chair the activity.

George Downs reported that test meters and attenuators for the repeater sites are under construction.

A flea market was discussed. Tentative date was set for the fall season.

Earle Benson discussed the plans for a social evening at the March meeting.

A nominating committee to select officers and directors for 1983-84 will be chaired by Earle Benson.

A new recorder was approved for the Marlboro repeater site.

A discussion on the placing of the club-produced controller took place. A decision on placement was put off until the February Director's Meeting. Dave Thornburg was appointed to study the placement and report back to the Directors at that time.

The meeting was adjourned at 10:00 PM.

Hal Fisher, WA1URF

BOARD MEETING - February 2, 1983

Al, KA1AL, reporting for the 07-67 220 machine, says that two boards of the kit are already put together with the power supply and amplifier close to being ready. The group will be looking for "cans" and an Austin antenna soon. The 61 machine is running well - the occasional noise heard is caused by the cavities arcing over. The TT decoder problem is caused by a voltage which is too low, so that only perfect tones are properly decoded. A new microprocessor-based controller is needed for the 450 machine which would allow wide area phone patching, touch tone testing, time of day, etc. and would make the Marlboro machine "best in the Boston area" and probably enticing more members to join MMRA. According to Steve, K1ST, the Marlboro 450 machine has about 30 regular users with maybe 60 people as occasional users passing through the area.

Bill, K1IJZ, says his SOX (smart VOX speech recognizer) is almost ready for installation on the 82 machine. It will have "flaky detect" and "patch denial" among its major features. Al Faul, KA1AKD, is working on the Attenuator project and Mike Kiron, N1CGF, is working on the RF Power Meter project.

After considerable discussion, the Board of Directors reaffirmed its current policy of sending one Newsletter to each household that has a Family Membership.

The date of the next MMRA meeting was changed to March 28 (instead of March 21 - space not available) at Weston - A Wine and Cheese Party at \$1.50 per person - bring your OM/XYL or girl friend, as appropriate. A short business meeting will be held and the speaker will be Jack Harrigan, W1PSG, who will show slides and talk about covered bridges. Reservations should be made through the designated person on each repeater or by mailing a reservation to MMRA, P.O. Box 2282, Lexington, MA 02173. Raffle prize this time will be a SPLIT-THE-POT with half of the receipts going to the Club, the other half to the prize winner. Raffle tickets \$1.00 each as usual.

Other items discussed were the need for amateur coverage at the BAA Marathon on Monday, April 18th (see N1HR) and the future possibility of linking 61 with K1MOQ's repeater chain in Tunbridge, Vermont. Plans are underway to adopt a Fiscal Year beginning September 1983 with all members to pay dues at once and renewals pro-rated according to previously recorded expiration dates.

WA1YRQ

## COMING EVENTS

April 9, Saturday - The Third Annual Hamfest-Flea Market, sponsored by the Great Bay Radio Association will be held at the Somersworth Armory, Somersworth, N.H. from 9:00 am to 3:00 pm. Antique radios and computers will be on display. Food and refreshments available. Free parking. Entrance fee \$1.00 per person. For advance reservations and further information, call Dick Sedgewick, N1EX at (603)742-3703, or write Great Bay Radio Association, Rt. 16, Dover, NH 03820. Talkin on 146.52 or 147.00. Doors open for setup at 8:00 am. Date and info tentative.

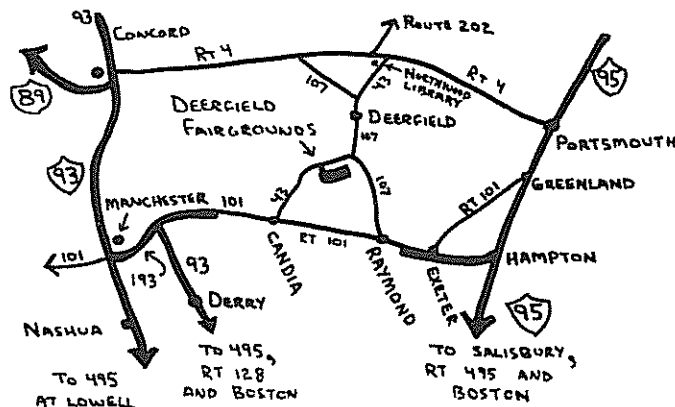
April 10, Sunday - The Framingham Amateur Radio Association will hold its Annual Spring Flea Market at the Framingham Civic League Hall on Concord Street (Route 126) in downtown Framingham located on the corner of Sanger and Concord Streets, one block south of Dunkin Doughnuts. Doors open as usual for sellers at 9:00 am and 10:00 am for buyers. Admission is \$2.00. Tables are available in advance for \$10.00. Write the Framingham Amateur Radio Assoc., P.O. Box 3005, Framingham, MA 01701. Talkin will be on 147.15/.75 and 146.52 direct; food available.

### FLEA MARKET

To celebrate its 52nd Anniversary in Amateur Radio, the South Shore Amateur Radio Club of Braintree, Mass., will hold an indoor flea market on Sunday, April 17, 1983 at the Viking Club, 410 Quincy Avenue, Braintree, Mass., from 11 a.m. to 4 p.m. There will be eight-foot (8'), tables available for \$10.00 each (which includes 1 free admission) and paid for in advance by sending the appropriate amount to Ed Doherty, W1MPT/236 Wildwood Avenue/Braintree, Mass. 02184. Checks should be made payable to the South Shore Amateur Radio Club. Confirmation of check receipt will be sent. No cancellation refund after April 16. The Viking Club will open to vendors at 10 a.m. Doors open to the public at 11 a.m. with an entrance fee of \$1.00 which includes 1 chance toward the door prizes. Additional chances may be purchased 3 for \$1.00. Winners do not have to be present to win. Plenty of parking. We'll run, rain or shine! We sold out all tables last year so don't be disappointed - first come, first served. Questions?? call (617)843-4431 (Ed, W1MPT), evenings.

Kris Johnson, K1WQ  
Secretary, S.S.A.R.C.

May 7, Saturday - The Hoss Traders will hold their 10th Annual Swapfest at the Deerfield New Hampshire Fairgrounds. Admission one dollar, tail gating included. Friday night camping fee collected by Fairgrounds Assoc. Good food available. All profits benefit Boston Burns Unit of the Shriners' Hospital for Crippled Children. Talkin on .52 direct or 146.40/147.00. Questions S.A.S.E. to Joe Demaso K1RQG Star Rt., Box 56, Bucksport, ME, or Norm Blake, RFD Box 57, West Baldwin, ME 04091 or Bob Tiffany W1GWU, 105 Walton Road, Seabrook, NH 03874. Rain or Shine.



## GREYLOCK RADIO TOWER

Many local hams became involved in the battle to save the antenna tower on Mount Greylock. That they were successful was due in large part to the efforts of local amateurs Jack, WILIM, Bruce, KALIG, Jack, WIZIG, and a host of others too numerous to mention, whose influence brought about the passage of Bill H6749 in the final hours of Governor King's administration. The complete text of the legislation follows:

H 6749

Chapter 652

The Commonwealth of Massachusetts  
In the Year One Thousand Nine Hundred and  
Eighty-two

AN ACT RELATIVE TO THE RADIO COMMUNICATION TOWER  
LOCATED ON MOUNT GREYLOCK IN THE TOWN OF ADAMS.

Whereas, The deferred operation of this act would tend to defeat its purpose, which is to allow the use of the tower on Mount Greylock by amateur radio organizations, therefore it is hereby declared to be an emergency law, necessary for the immediate preservation of the public convenience.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

SECTION 1. Notwithstanding the provisions of any general or special law to the contrary, the department of environmental management, upon receipt of a technical report prepared by the Northern Berkshire Amateur Radio Club concerning the effectiveness of on-tower vs. off-tower operations, shall allow said Club to attach and operate antennae to the former state police radio communications tower located within the Mount Greylock reservation in the town of Adams, subject to the following conditions:

(a) members of said club shall be responsible for the continuing maintenance of said tower at no cost to the commonwealth; and

(b) connecting cables and other related equipment shall be buried underground, or otherwise hidden from view, insofar as is technically feasible.

SECTION 2. A special task force to consist of the commissioner of environmental management, the commissioner of public safety, and a third person with technical expertise in radio communication to be chosen by said commissioners, is hereby established for the purpose of reviewing and evaluating data on the desirability of retaining said communications tower on Mount Greylock, subject to the provisions of section one. In the review and evaluation of such data, said task force shall consider all available information with regard to emergency radio communication and all appropriate alternatives to the use of said tower for emergency radio communication. Said task force shall establish reasonable standards regarding the geographical area and depth of coverage necessary to ensure public safety.

SECTION 3. Said task force shall report to the general court the results of its review and study and its recommendations, if any, by filing a report with the joint legislative committees on public safety, and natural resources and agriculture, concerning the future status of said tower and its use by the Northern Berkshire Amateur Radio Club. Said report shall be submitted to said committees not later than May first, nineteen hundred and eighty-three. The recommendations of said task force shall be designed, to the maximum extent feasible, to ensure the safety of the public

and to maintain and protect the environmental quality of the Mount Greylock Reservation.

SECTION 4. The joint legislative committees on public safety, and natural resources and agriculture, shall submit their recommendations for legislation regarding the future status of said radio tower and its use by said radio club, to the clerk of the house of representatives within sixty days of the submission of the report of said task force.

SECTION 5. This act shall take effect upon its passage.

House of Representatives, January 4, 1983

Preamble adopted, s/ Thomas W. McGee, Speaker

In Senate January 4, 1983

Preamble adopted, s/ William M. Bulger, President

House of Representatives, January 4, 1983

Bill passed to be enacted,  
s/ Thomas W. McGee, Speaker

In Senate, January 4, 1983

Bill passed to be enacted,  
s/ William M. Bulger, President

January 5, 1983

Approved at 6 o'clock and 21 minutes, P.M.

s/ Edward J. King  
Governor

## HERE and THERE

Effective February 15, 1983 WB1GOF, the radio station of the Police Amateur Radio Team (PART) in Westford, Mass. will be accessed by a one second tone of the asterisk to open the receiver. This change was mandated by the nearly constant chatter on 52 which proved distracting to normal activity in the Westford Police Headquarters. Hams using the 146.52 frequency will be reminded of this change by an addition to the familiar blue signs along the highways in the Westford area. PART has registered a record 441 calls for assistance during the year 1982 -- a super achievement. All hams are welcome to join the PART net Sunday evenings at 8 PM on 146.52 (no tone access needed).

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## FOR FOX HUNTERS

### HIDDEN TRANSMITTER HUNT

Sponsored by MMRA, Sunday, April 17, starting at 10:30, ending by 11:30, rain, sun, hot, cold or drizzle. Meet at 10:00 AM at McDonalds on Main Street in Waltham, Route 20, East from Route 95/128. Lots of parking. Prizes for first and second place and lowest mileage from starting point to finish. Prizes may include free one-year MMRA membership, gift certificates, among other surprises. Talk-in on 146.22/82 and 52/52.

W1JSH

## SPECIAL NOTICE

Fred Campbell, WB1FAE, has been named by the Board of Directors to head up a new Membership Committee. As a first step, he proposes that each MMRA member take it upon himself to interest at least one other amateur in joining MMRA. More information later.

## SCANNING MICROPHONE MOD

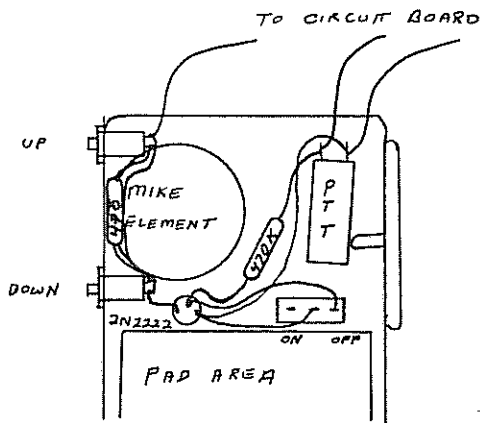
Wouldn't it be nice if you could change the frequency of your IC-25A (or many other late model ICOM rigs) from the microphone as you are driving down the highway? Well, with only a simple modification to your microphone you can enjoy this feature. ICOM was nice enough to provide the connection to do this right on the microphone connector.

If your rig will use the IC-HM10 scanning mike, you already have the connection at the mike connector. (Some of the older rigs which use the 8 pin mike connector have the needed circuitry, but don't have the wire running to the connector on the front panel. The instruction sheet for the IC-HM10 lists the rigs which can be modified and the procedure for doing it.) I installed the modification in the IC-HM8 Touchtone mike which comes with the IC-25A; but the added circuitry could be placed in any of the mikes which will work with the rig. You will only need a few parts to make the needed additions. The hardest parts to find will be the two tiny, normally open, pushbuttons needed. (The available space is cramped!) I found mine at You-Do-It in Needham. The other parts needed are a 470 ohm 1/4 watt resistor, a 470k 1/4 watt resistor, and an NPN switching transistor such as a 2N2222. You will also need a new mike cable which has one more wire than the one now on the mike. Belden makes a nice replacement cable which has 5 conductors with a shield around one of them. This is available at Telcom in Littleton (and possibly You-Do-It also). This cable has a couple of other advantages; it is slightly longer and made out of a different material which is more flexible than the one which comes on the mike. It is also slightly smaller in diameter.

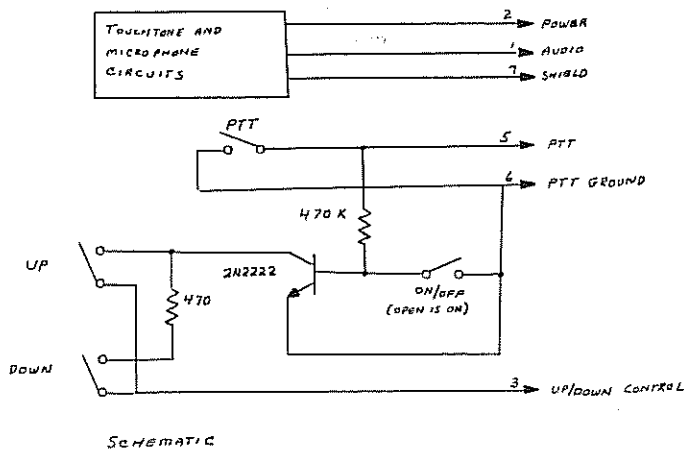
To use the new controls, you turn on the switch which used to turn on and off the touchtone pad. This enables the two pushbuttons. At this point, if you briefly push one of the buttons, the display will change in the appropriate direction. If you hold the button down, the display will start "scanning" in the selected direction until you release the button. The buttons are deactivated when the PTT switch is pushed so that you won't go sliding up (or down) the band as you talk and accidentally push one of the buttons.

The up mode is selected by grounding the up/down control lead. To go down, the up-down control lead is grounded through a 470 ohm resistor. The circuitry inside the radio detects the level of the grounding and does the appropriate thing. The transistor is used to sense the closure of the PTT switch and remove the ground path from the two pushbuttons so that the up/down control line does not see any path to ground.

First, remove the back from the IC-HM8 by removing the single screw at the top of the back and then pivoting it on the bottom edge. Then remove the existing mike cable and the rubber strain relief. Remove the strain relief from the cable by carefully removing the metal clip and put both aside for later use. Now gently lift the circuit board from the case. It will still be tied in by the leads from the PTT switch and the leads from the pad ON/OFF switch. Remove these leads from the circuit board. Rearrange the two leads from the ON/OFF switch so that they form a closed switch when the switch is in the off position. There should only be two wires, one from each side, left on the PTT switch.



PHYSICAL LAYOUT



Now the hard part. Make two holes in the case for the pushbuttons. Watch out for clearances to other parts. A good place is on the side opposite the PTT switch. One is above the mike element, the other is below. Wire one side of one pushbutton to the same side of the other with a piece of wire. Wire the 470 ohm resistor from the other side of one of the pushbuttons to the same side on the other. Don't forget the clearances to other parts such as the circuit board and the mike element when you are placing the switches and their wiring. Attach a 6 inch piece of small stranded wire to the pole of the UP pushbutton attached to the 470 ohm resistor. The other end will be connected later.

Hang the transistor by its collector lead between the space for the mike element and the keyboard from the DOWN pushbutton's pole connected to other by the wire. Attach the base of the transistor to one side of the PTT switch with the 470k resistor. Attach the emitter to the other side of the PTT switch with a piece of wire (not the one already there). Attach one of the wires from the ON/OFF switch to the base of the transistor. Attach the other wire to the emitter.

Find two pads on the circuit board not connected to anything. These will be used as tie points for wires from the mike cable, from the new circuit and from the PTT switch. Carefully put the circuit board back into the case. Make sure you properly align the connector from the keypad. You should have three wires to route over the top of the board. Two from the PTT switch, and one from the new circuit. Attach the wire from the top of the UP pushbutton to one of the empty pads. Attach the wire from the side of the PTT switch which connects to the emitter of the transistor to the other pad. Attach the remaining wire from the PTT switch to the pad marked PTT.

Take the new mike cable and remove the metal clip on it, strip the outer jacket back about an inch, and strip the wires about 1/8 inch. Place the strain relief removed earlier on the cable and replace the clip on the cable above the strain relief. (Use the clip from the old cable if the new one doesn't have one. It IS necessary!!) Using table 1, attach the wires from the mike cable to the circuit board. Now replace the back. Be careful not to crimp any of the wires.

TABLE 1  
Cable connections at microphone end.

COLOR	WHERE	SIGNAL
Shield	Large etch on outer rim	Audio shield
White	Etch marked OUT	Audio
Red	Etch going to chip pin 1	Power
Black	Wire from PTT Switch	PTT ground
Blue	Wire from up pushbutton	Up/down
Yellow	Etch marked PTT	PTT

Next, remove the connector from the old cable. Attach the wires from the new cable using Table 2. The colors match the ones in the Belden cable. Wrap the new cable with tape to form a strain relief. Again, this is absolutely necessary!!

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TABLE 2  
Cable connections at connector end.

COLOR	WHERE	SIGNAL
Shield	pin 7	Audio shield
White	pin 1	Audio
Red	pin 2	Power
Black	pin 6	PTT ground
Blue	pin 3	Up/down control
Yellow	pin 5	PTT

Pins 4 and 8 will have no connection.

Congratulations. The only thing left is to enjoy the convenience. It actually sounds harder in the telling than it is to actually do. Don't let the detail scare you off. If you have gotten switches which are small enough, there is no reason you can't make the modification.

Bob Gettys, N1BRM

## TECHNICAL CORNER

### PRECISION TEST EQUIPMENT BEING BUILT FOR REPEATER MAINTENANCE

In order to adjust the receiver and duplexer at a repeater site, it is necessary to have a stable, on-frequency signal source of known power, plus a means of varying the signal by known amounts. A program is under way to provide each of the MMRA 2-meter sites with the following:

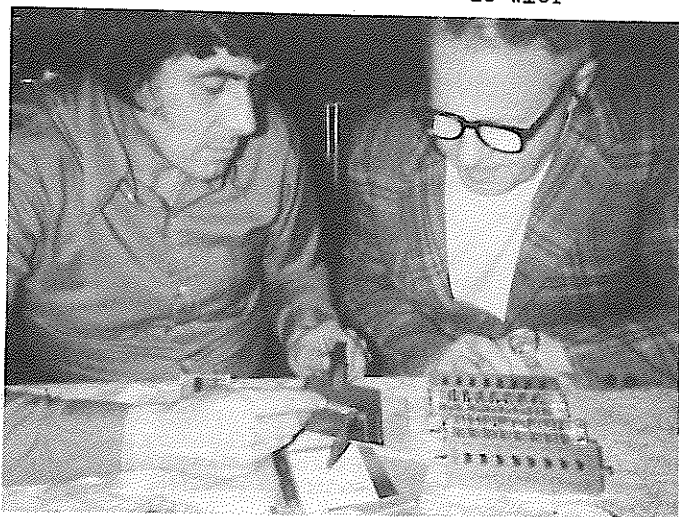
- A stable, synthesized frequency source
- A precision attenuator
- A precision, calibrated microwatt meter

The equipment design and layout comes from models originating with Bob Wilmarth, W1CMMR. Bill Wade, K1IJZ, has made some layout suggestions relative to the Wattmeter, and is generally overseeing the technical end of things.

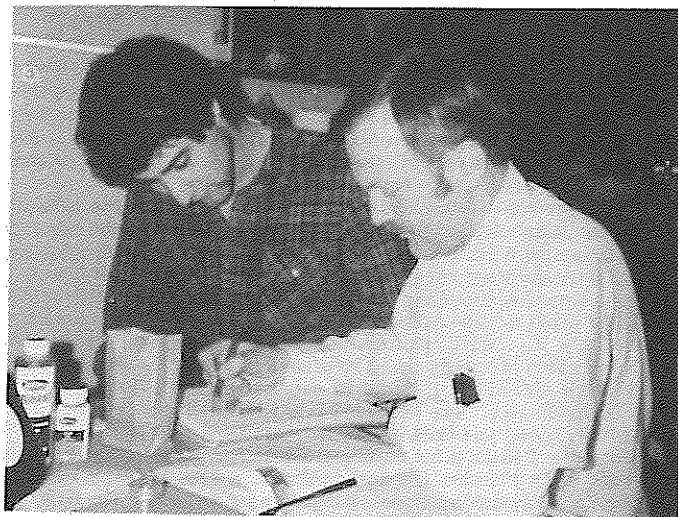
Al Faul, K1AKD has undertaken to make the mechanical layout, buy all the parts and assemble the synthesized signal generators and the attenuators. The attenuators are almost finished (see photo) and Al is targeting to complete the project by the time of the May meeting.

Mike Kiron, N1CGF has undertaken the layout, assembly and test of the microwattmeter. He has all his parts and is under way. Like Al, Mike is targeting to have these units on display at the May meeting.

de W1CT



Al, K1AKD (left) shows George, W1CT a template for drilling holes for I.C. sockets. Note attenuators - right front.



Mike, N1CGF (left) studies P.C. card layout suggested by Bill, K1IJZ for the microwatt meters Mike is building.

## AUTO EMISSION INSPECTION

The Registry of Motor Vehicles has plans to start a tough inspection system on April 1 that will concentrate on exhaust emissions. Only a few of the state's 4400 inspection stations have ordered the \$7900 machines needed to analyze auto exhaust. Registrar Mackey hopes that 1000 will be ready by April [eventually 2000 will be needed] in spite of a pending bill to postpone the start of the program until September.

Under the program, inspection of the 3.4 million vehicles in the state would be staggered around the year, with each car being inspected [once a year] according to the last digit of the license plate [fee \$10.00]. Only those vehicles with a plate ending in the numeral 4 will be inspected in April, the fourth month.

Those with plates ending in 1, 2 and 3 get a break - they don't have to be inspected until January, February and March 1984. Inspection stickers issued for those vehicles last October will be valid into 1984.

The 11th and 12th months, November and December will be reserved for the inspection of vehicles with vanity plates and government-owned vehicles. [In checking with the Registry of Motor Vehicles, they say that ham plates, such as W1ABC, are due for inspection in the first month of the year (i.e. January, 1984). W2's come due in February, etc. Ed.]

Cars more than 15 years old are not required to meet emissions standards and the standards vary from model year to model year. Cars built in 1975, for example, are tested on different standards from those built this year.

Each testing machine is a small computer which has built into it the state's standards for different cars and model years. From a probe inserted into a car's tail pipe, the machine will analyze levels of carbon monoxide, carbon dioxide and hydrocarbons. [Diesel cars are exempt as are motorcycles, vehicles over 10,000 pounds and vehicles whose top speed is less than 25 MPH.]

The machine, not the operator, decides whether a car passes or fails the test. Those who fail have 15 days to correct the problem, usually with new spark plugs or a carburetor adjustment, and are entitled to one free re-test. One printed copy of the test results churned out by the machine will go to the motorist, another to the inspection station owner, and a third to Registrar, DEQE and EPA officials.

continued on page 7

## SOCIALIZING at the JANUARY MEETING



Vehicles will continue to be inspected for the traditional safety features such as brakes, lights, wipers and broken glass. Rejection of a car on those grounds must still be recorded on the machine.

If a car still fails inspection after the repairs required have been completed and if estimates for further repairs total \$100 or more, the motorist can apply for a waiver to operate the car in its present condition.

Motorists who removed their catalytic converters and the gasoline fill cap restrictor so they could use leaded gasoline will be required to replace both or automatically fail inspection.

Boston Globe Jan. 26, 1983

## SPECIAL NOTICE

The MMRA Public Service Net has moved to a new time. The net can now be heard on 22-82 at 7:30 PM each Tuesday.

Dave Thornburg, N1HR is looking for volunteer hams to assist at the start and finish lines of the BAA Marathon on April 18th. Dave can usually be found on the Marlboro repeater 146.01-61.

## NEW INSPECTION SCHEDULE

The last number in the number portion of your license plate determines the month in which your car must be inspected.

MASSACHUSETTS 904 IBR	1 - January	MASSACHUSETTS BENNY 7	7 - July
	2 - February		8 - August
	3 - March		9 - September
	4 - April		0 - October
MASSACHUSETTS 285 HOX	5 - May		* - November
	6 - June		* - December

\* Vehicles with all letter plates will be inspected in November; state and municipal vehicles in December; antique cars in June.

## INSPECTION FEE

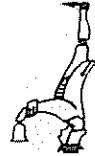
The fee for the new once-a-year safety and emissions inspection is \$10.00.

For additional information, call toll-free 1-800-462-0462.

## 1982-83 MEETING DATES

MONDAY - MARCH 28, 1983 - Weston  
TUESDAY - MAY 17, 1983 Election Meeting - Weston

FIRST CLASS MAIL

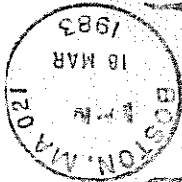


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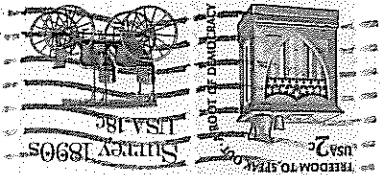
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